

Supplementary materials for “Analysis of the variability of floral and pollen traits in apple cultivars - selecting suitable pollen donors for cider apple orchards”

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Table S1. Reported parentage and flowering time (full bloom) of 45 apple genotypes in Villaviciosa (north-western Spain).

Cultivar	Pedigree	Flowering time
Cladurina*	Durón Arroes x Clarina	Intermediate
Cladurina Amargo-Ácida*	Durón Arroes x Clarina	Intermediate
Colladina*	Collaos x Florina	Intermediate/late
Colorá Amarga**	Coloradona x H6419	Early/intermediate
Durcolorá**	Durón Arroes x Coloradona	Intermediate/late
Perurico*	Perico x H232	Intermediate/late
Perurico Precoz*	Perico x H233	Intermediate/late
Raxarega*	Raxao x H232	Very late
Raxila Ácida*	Raxao x Priscila	Intermediate/late
Raxila Dulce**	Raxao x Priscila	Intermediate
Raxila Rayada*	Raxao x Priscila	Intermediate/late
Raxina Ácida*	Raxao x Florina	Late to very late
Raxina Amarga*	Raxao x Florina	Intermediate/late
Raxina Dulce*	Raxao x Florina	Late
Raxina Marelo*	Raxao x Florina	Intermediate/late
Raxona Ácida*	Raxao x H232	Late
Raxona Dulce**	Raxao x H232	Late
Rosadona*	Coloradona x H6419	Intermediate
X9406-11**	Reineta Encarnada x H2310	Intermediate/late

X9406-49**	Reineta Encarnada x H2310	Intermediate/late
X9406-57**	Reineta Encarnada x H2310	Early/intermediate
Blanquina	Unknown (local cultivar)	Intermediate
Carrió	Unknown (local cultivar)	Late
Clarina (also known as 'Clara')	Unknown (local cultivar)	Early/intermediate
Collaos	Unknown (local cultivar)	Late
Coloradona	Unknown (local cultivar)	Early/intermediate
De la Riega	Unknown (local cultivar)	Intermediate/late
Durona de Tresali	Unknown (local cultivar)	Late/very late
Ernestina	Unknown (local cultivar)	Late
Fuentes	Unknown (local cultivar)	Late/very late
Limón Montés	Unknown (local cultivar)	Very late
Meana	Unknown (local cultivar)	Late
Panquerina	Unknown (local cultivar)	Late
Perezosa	Unknown (local cultivar)	Intermediate
Perico	Unknown (local cultivar)	Very late
Prieta	Unknown (local cultivar)	Very late
Raxao	Unknown (local cultivar)	Extra-late
Regona	Unknown (local cultivar)	Very late
San Roqueña	Unknown (local cultivar)	Late
Solarina	Unknown (local cultivar)	Late/very Late
Teorica	Unknown (local cultivar)	Late
Verdialona	Unknown (local cultivar)	Intermediate/late
Xuanina	Unknown (local cultivar)	Late
Granny Smith	Bred from 'French Crab'	Intermediate
<i>Malus floribunda</i> 821	Clone 821 of <i>Malus floribunda</i>	Very early

*Cultivars obtained by the SERIDA breeding program already protected.

**Plant material from the SERIDA breeding program in the process of registration and protection.

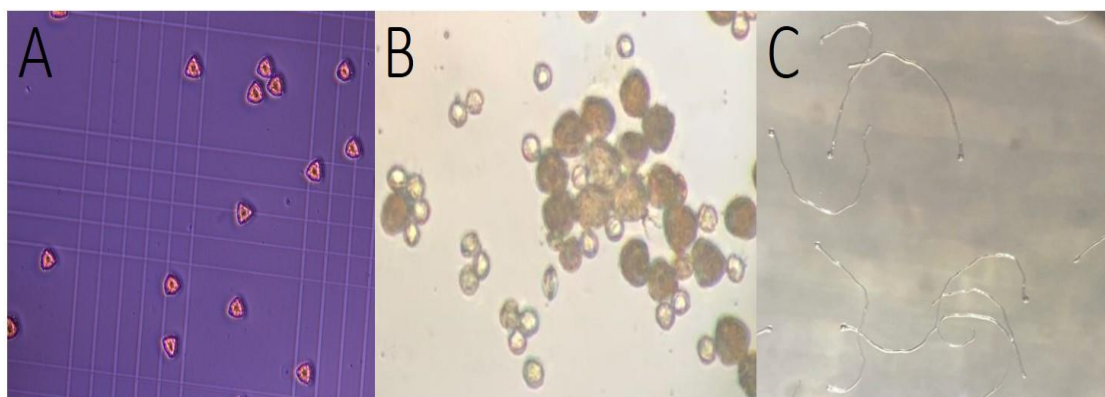


Figure S1. Pollen production, pollen viability and pollen germination of apple pollen grains. (A)

Apple pollen grains stained with aqueous eosin solution in a Malassez hemocytometer (10×

magnification). (B) Pollen viability test of apple pollen grains using IKI stain (10× magnification).

Pollen grains stained dark are scored as viable and unstained grains are counted as non-viable.

(C) *In Vitro* pollen germination in concentrated agar (1.5%) containing 10% sucrose and boric acid (240 mg/L) after 24 hours at 21°C. Pollen grains were considered germinated when the length of a pollen tube exceeded its diameter.

Table S2. Percentage of inflorescences in an ‘on’ year which flowered again in an ‘off’ year among a list of 24 apple cultivars.

Cultivar	Return bloom (%)
Ernestina	0.4
Solarina	0.6
Regona	1.2
Cladurina Amargo-Ácida	9.4
Prieta	18.5
San Roqueña	20.3
Perurico	23.2
Perurico Precoz	31.6
Raxarega	36.4
Raxona Ácida	39.1
Limón Montes	41.2
Raxina Dulce	42.4
Durcolorá	43.2
Raxila Ácida	44.0
X9406-11	50.5
Raxina Ácida	55.7
X9406-49	60.1
Raxila Dulce	61.2
Colorá Amarga	66.7
Raxina Marelo	70.0
Granny Smith	79.9
Raxila Rayada	80.6
Colladina	81.4
Raxina Amarga	84.2

Figure S2. Flowering period of 44 apple (*Malus domestica* Borkh.) cultivars in two successive flowering seasons (i.e., 2018–2019 or 2019–2020) in Villaviciosa (north-western Spain). F1, F2 and G stand for the date of first bloom, full bloom and petal fall, respectively. The solid colour bars indicate the blooming duration for each flowering season. Symbol “*” stands for missing phenological data.

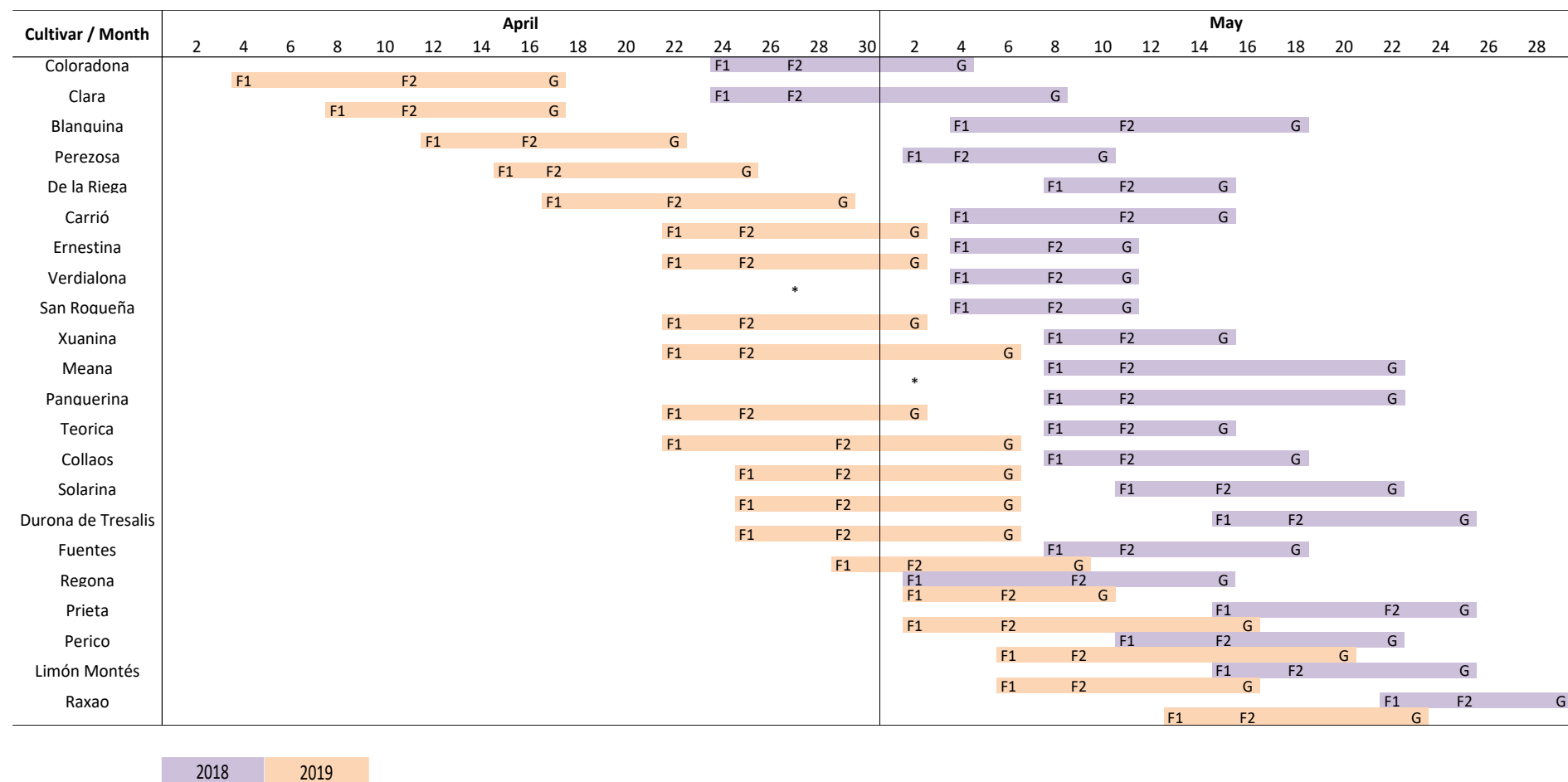


Figure S2. Continued.

